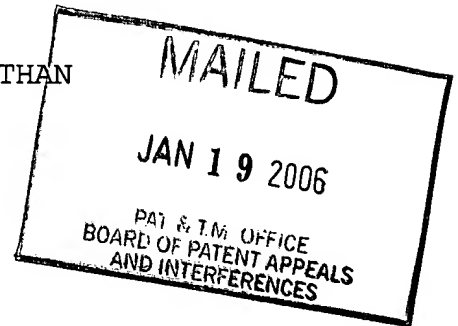UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte MATTHEW BUNKLEY TREVATHAN

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Appeal No. 2006-0164
Application No. 09/826,085

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ON BRIEF

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MAILED

JAN 19 2006

PAT & T.M. OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

Before KRASS, OWENS, and SAADAT, <u>Administrative Patent Judges</u>.

KRASS, <u>Administrative Patent Judge</u>.

<u>DECISION ON APPEAL</u>

This is a decision on appeal from the final rejection of
claims 1 and 3-9.

The invention pertains to a technique for managing a cache.
In particular, information stored in a caching profile is analyzed,
and, responsive to the analysis, a preferred caching algorithm is
selected from a plurality of caching algorithms.

Representative independent claim 1 is reproduced as follows:

1.   A method for managing a cache, comprising the acts of:

analyzing information stored in a caching profile; and

responsive to the act of analyzing, selecting a preferred caching algorithm from a plurality of caching algorithms;

wherein the act of analyzing is performed by a predictive modeling engine.

The examiner relies on the following references:

Gaither	6,223,256	Apr. 24, 2001
		(filed Jul. 22, 1997)
Arlitt et al. (Arlitt)	6,272,598	Aug. 07, 2001
		(filed Mar. 22, 1999)

Additionally, the examiner relies on admitted prior art (APA), at pages 2-3 of the specification, relating to a most-recently-used caching algorithm and a most-used caching algorithm.

Claims 1, 3-7, and 9 stand rejected under 35 U.S.C. § 102(e) as anticipated by Gaither.

Claim 8 stands rejected under 35 U.S.C. § 103 as unpatentable over Arlitt in view of APA.[1]

Reference is made to the briefs and answer for the respective positions of appellant and the examiner.

<div align="center">OPINION</div>

Turning, first, to the rejection under 35 U.S.C. § 102(e), a rejection for anticipation requires that the four corners of a single prior art document describe every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation. In re Paulsen, 30 F.3d 1475, 1478-79, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994).

Taking claim 1 as exemplary, the examiner contends that Gaither discloses a method for managing a cache (pointing to the abstract), wherein information stored in a caching profile is

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[1]We find it curious that dependent claim 8, which includes all of the limitations of independent claim 5, was rejected based on the primary reference to Arlitt, while claim 5 was rejected based on Gaither, with Gaither forming no part of the rejection against claim 8.

analyzed (pointing to column 8, lines 41-47), and, responsive to
the act of analyzing, selecting a preferred caching algorithm from
a plurality of caching algorithms (the examiner cites the abstract
and states that "the analyzed information, or the cache class
attribute is used to select a replacement algorithm" (answer-page
4)). The examiner further points to column 8, lines 45-47, of
Gaither for a teaching of a predictive modeling engine for
performing the act of analyzing, specifically referring to the
collection and analysis of information by the operating system or
other run-time software.

More specifically, the examiner contends that column 8, lines
41-42, specifically states "'dynamic analysis of program run-time
behavior is used to assign cache class attributes,'"and the
abstract states "'Class attributes may indicate a relative
likelihood of future use'" (answer-page 4). The examiner then
concludes, at page 4 of the answer, that

> Since the collection of information computed and
> gathered, i.e. frequency or infrequency of entries, entry
> residency time, and replacement history, is a model of
> the run-time behavior of a program and since this model,
> or run-time behavior information, is used to assign class
> attributes that may indicate relative likelihood of
> future use, i.e. prediction of future use, the
> 'predictive modeling engine' is disclosed.

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Appellant's view is that Gaither does not teach the claim recitation, "wherein the act of analyzing is performed by a predictive modeling engine." Appellant asserts that the cited portion of Gaither (column 8, lines 45-47) simply indicates that certain information is "gathered" by the operating system or other run-time software, but that Gaither does not indicate that the operating system or other run-time software actually "analyzes" the information, as required by instant claim 1 (see page 5 of the principal brief).

Moreover, appellant contends that, in Gaither, the act of analyzing information stored in a caching profile does not trigger selecting a preferred caching algorithm, as claimed. Appellant argues that Gaither's analysis of information stored in a caching profile is performed only periodically, pointing to column 8, lines 42-45 (reply brief-page 2), whereas the instant invention requires the selection of a preferred caching algorithm to occur every time real-time data is ready to be placed in the cache. Thus, asserts appellant, Gaither does not disclose any correlation between when the caching profile is analyzed and when the preferred caching algorithm is selected. "Therefore, the act of analyzing information stored in a caching profile does not trigger selecting

a preferred caching algorithm, which means that the selection of a preferred caching algorithm is not in response to the act of analyzing information stored in a caching profile" (reply brief-page 2).

We have reviewed the evidence before us, including the applied references and the arguments of appellant and the examiner and we conclude from such a review that the examiner has presented a prima facie case of anticipation with regard to independent claim 1 which has not been successfully rebutted by appellant.

At pages 3-4 of the answer, the examiner explains, reasonably, in our view, how each and every claimed element is met by the disclosure of Gaither. Appellant argues that while Gaither's operating system or other run-time software "gathers" information, it does not "analyze" that information, as required by the claim. However, we agree with the examiner that column 8, lines 51-53 of Gaither recites that "the run-time software may dynamically change the cache class of pages (page-table-entries) based on run-time behavior" and that this is clearly indicative of an "analysis" by the software because, as the examiner rhetorically asks, "How is the run-time software to know how to change and what to change to

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dynamically if it merely gathers information?" (answer-page 10).
The examiner further points to column 4, lines 60-62, of Gaither
for a recitation that "the cache attribute may be determined at
run-time based on historical data" and asserts that this "further
indicates analysis by the run-time software or the operating
system" (answer-page 10).

The examiner's rationale appears reasonable to us and
appellant has not convinced us of any error in the examiner's
position.

In the reply brief, appellant contends that Gaither differs
from the instant invention because Gaither analyzes information
only "periodically." This argument is not persuasive since there is
nothing in instant claim 1 precluding a "periodic" analysis. As
long as the prior art discloses that information stored in a
caching profile is analyzed and that analysis is performed by a
predictive modeling engine, which, in our view, the examiner has
shown, the claim language relating to "analysis" is met. It
matters not, within the terms of the claim language, whether that
analysis is performed periodically, or not.

Appellant also argues that Gaither does not disclose any correlation between when the caching profile is analyzed and when the preferred caching algorithm is selected, asserting that, in Gaither, "the selection of the cache replacement algorithm is triggered by the need to store the real-time data in the cache and not by the analysis of the information stored in a caching profile which occurs only periodically" (reply brief-page 2).

The claim language requires that the preferred caching algorithm is selected "responsive to the act of analyzing." It does not require any "direct" correlation between the algorithm selection and the analysis. In its broadest, yet reasonable, interpretation, the claim language of interest merely requires that there be some connection between the analysis and the selection of the preferred caching algorithm. It is our view that the examiner has reasonably shown such a connection by pointing out that since Gaither uses the cache class attribute to select a replacement algorithm (abstract-"The cache may use a different replacement algorithm for each possible class attribute value"), and class attributes are part of the analysis (abstract-"Class attributes may indicate a relative likelihood of future use"), then it follows that the selection of the replacement algorithm is "responsive to"

the class attributes; thus, Gaither suggests a step of "responsive to the act of analyzing, selecting a preferred caching algorithm..."

Accordingly, we will sustain the rejection of claim 1 under 35 U.S.C. § 102(e).

Independent claim 3 is similar to claim 1 but adds a step of "updating a caching profile in response to arrival of a file" and, then, "responsive to the act of updating, analyzing information..."

The examiner points to column 8, lines 41-53, of Gaither for a disclosure of "updating a caching profile in response to arrival of a file." However, we have reviewed the cited portion of Gaither and fail to find any such update of a caching profile, especially any updating responsive to the arrival of a file. That portion of the reference contains a recitation about dynamically changing the cache class of pages. One may conclude that "dynamically changing" something is tantamount to an "update" of that something, but we cannot conclude from the recited portion of Gaither that there is a dynamic change, or update to a "cache profile," as claimed. Moreover, assuming that a dynamic change to the cache class of pages may be considered to be an update of a cache profile, we find

no teaching, or suggestion, in Gaither that such an "update" of the cache profile causes an analysis of information stored in the caching profile. We agree, for the reasons supra, with regard to claim 1, that one may reasonably interpret Gaither as disclosing an analysis of information stored in a caching profile, and that there is a selection of a preferred caching algorithm responsive to that analysis, but we are hard pressed to find, in the teachings of Gaither, that the analysis of information stored in a cache profile is performed responsive to an updating of the caching profile, which, in turn, is performed responsive to the arrival of a file.

We do not follow the examiner's allegation that Gaither discloses an updating of a caching profile in response to the arrival of a file because "the collection and analysis of information is done *dynamically* at run-time" (answer-page 4). Even if the examiner is correct, and we do not contend that the examiner is correct, and analysis of information on-the-fly, or dynamically, somehow equates to an update of a cache profile, the claim still requires that this updating is performed "responsive to arrival of a file" and, then, responsive to the updating, information is analyzed. We find nothing in Gaither, or in the examiner's explanation, requiring the updating step to occur prior to the

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analyzing step, with the analyzing step being performed responsive to the act of updating.

Accordingly, we will not sustain the rejection of claim 3 under 35 U.S.C. § 102(e).

With regard to claim 4, while we would agree, for the reasons supra, with regard to claim 1, that Gaither teaches an analysis performed by a predictive modeling engine, claim 4 depends from independent claim 3 and includes all the limitations thereof. Accordingly, we will not sustain the rejection of claim 4 under 35 U.S.C. § 102(e).

Independent claim 5 recites that, in a cache managing system, information stored in a caching profile is analyzed responsive to arrival of a file at a cache, and that the analysis is performed "by computing a plurality of metrics." Further, in response to a comparison of metrics, a selection of a preferred caching algorithm is made.

The examiner alleges that the arrival of a file corresponds to Gaither's arrival of a compiled program, and that the computing of a plurality of metrics is taught at column 5, lines 7-8, since

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classes are ranked in a hierarchy, requiring some basis for comparison, or metrics. The examiner also points out that Gaither's disclosure of a measure of likelihood (column 8, lines 2-9) comprises the metrics that are computed and gathered (answer-page 5).

Appellant contends that Gaither does not teach that responsive to arrival of a file at a cache, information stored in a caching profile is analyzed.

We do not agree with appellant's argument anent Gaither's "periodically" observing a cache to detect entries, because the instant claim does not preclude a "periodic" analysis. We do, however, agree with appellant in the contention that Gaither does not appear to teach, and the examiner has not convincingly pointed out where Gaither teaches, that the analysis of information stored in a caching profile is performed in response to the arrival of a file.

It may very well be that a file arrives at a cache in Gaither and that an analysis of information stored in a cache profile takes place in Gaither, but the examiner has not shown that there is a definite connection between the two, viz., that the analysis is

performed in response to, and because of, the arrival of the file

at the cache.

Accordingly, we will not sustain the rejection of claim 5

under 35 U.S.C. § 102(e). It follows, then, that we also will not

sustain the rejection of claims 6, 7, and 9 under 35 U.S.C.

§ 102(e) since these claims depend from, and include the

limitations of, claim 5.

Thus, while we have sustained the rejection of claim 1 under

35 U.S.C. § 102(e), we have not sustained the rejection of claims

3-7 and 9 under 35 U.S.C. § 102(e).

Finally, we turn to the rejection of claim 8 under 35 U.S.C.

§ 103 as unpatentable over Arlitt in view of APA.

It is the examiner's view that Arlitt discloses the

limitations of claim 5 as follows:

Column 5, lines 48-50, is said to disclose "responsive to

arrival of a file at a cache, analyzing information stored in a

caching profile by computing a plurality of metrics" because the

arrival of a file is inherent since the subject matter of Arlitt's

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invention is a Web cache which caches Web page documents (referring to column 1, lines 15-29). The examiner contends that the hit rate computation of Arlitt can only begin in response to arrival of a file, since the reference to the file prior to its arrival is classified a "miss" (column 1, lines 53-54) and the determination of a hit rate and a byte hit rate, i.e., 'cache profile,' requires computations and storage (answer-page 7).

Column 5, lines 35-47, is said to disclose that responsive to a comparison of the metrics (i.e., hit rate and byte hit rate), selecting a preferred caching algorithm from a plurality of caching algorithms. The examiner contends that Arlitt's disclosure of each replacement policy being optimized for one performance metric makes it clear that the use of a particular replacement policy, i.e., caching algorithm, is based on the performance metric, and that algorithm selections based on the performance metrics require a comparison of metrics (answer-pages 7-8).

The examiner also points to column 5, lines 62-63, of Arlitt for a teaching of "wherein the plurality of caching algorithms includes a least-used caching algorithm (column 6, lines 4-5) and a least-recently-used caching algorithm."

The examiner admits that Arlitt does not disclose the use of a most-recently-used caching algorithm and a most-used caching algorithm, but turns to APA for such a teaching, concluding that it would have been obvious to use the additional replacement algorithms of APA in the dynamic cache management system of Arlitt, "in order to increase the versatility and performance of a web caching system since the additional algorithms allow the cache to adapt to caching patterns that not have (sic, have not?) been handled in an optimal way because of the limited number of caching options available prior to the combination. Also note that Arlitt specifically discloses that other known cache replacement algorithms may also be used (col. 7, lines 28-29)" (answer-page 8).

Appellant argues that Arlitt does not teach or suggest "responsive to arrival of a file at a cache, analyzing information stored in a caching profile by computing a plurality of metrics" (principal brief-page 15). While the examiner points to column 5, lines 48-50, of Arlitt for such a teaching, appellant argues that this section of Arlitt is "totally silent as to the 'responsive to arrival of a file at a cache'" aspect of claim 8. In fact, appellant argues, the examiner has not even considered the issue of whether the alleged "analyzing information" in Arlitt is

"responsive to arrival of a file at a cache" (principal brief-page 16).

Moreover, appellant contends that Arlitt fails to disclose the claimed feature of "'responsive to a comparison of the metrics one with another, selecting a preferred caching algorithm...'" (principal brief-page 16).

Further, appellant contends that Arlitt, even in view of APA, fails to disclose or suggest the claimed feature of "wherein the plurality of caching algorithms includes a least-used caching algorithm, a most-used caching algorithm, a least-recently-used caching algorithm, and a most-recently-used caching algorithm." While appellant acknowledges that APA mentions that a most-recently-used caching algorithm and a most-used caching algorithm are known in the art, appellant contends that APA "does (sic, does not?) disclose selecting (in comparison of the metrics one with another) a preferred caching algorithm from a plurality of caching algorithms that include a most-recently-used cache algorithm and a most-used cache algorithm, as required by claim 8" (principal brief-page 17).

Our review of the evidence reveals that appellant is correct in the allegation that Arlitt fails to disclose the arrival of a file at a cache and, responsive to that arrival, analyzing information stored in the caching profile by computing a plurality of metrics.

It appears that Arlitt permits a user of the system to request an object, e.g., a Web page, and, before any Web page is transmitted to the user's device, a search is made of the cache at the local server to determine if that object is already there. The "hit" and "miss" rates described in Arlitt relate to whether the requested object is in the local server cache. If a "hit" is found, i.e., the requested object is in the cache of the local server, then the requested object, viz., the Web page, is not even transmitted from the remote server and, therefore, cannot be said to "arrive" at the cache of the local server. Thus, in Arlitt, any "analysis" is performed prior to any arrival of a file at the cache and, where there is a "hit," there may not be any arrival of a file at all. Accordingly, we are unpersuaded by the examiner's argument that the arrival of a file at a cache in Arlitt is "inherent" (it does not always occur) or that the determination of a hit rate in Arlitt is responsive to the arrival of a file because such a determination can only be conducted in response to arrival of a

file, since a reference to the file prior to its arrival is classified as a "miss" (answer-page 18). While it may be true that an analysis of a "hit" rate is based on a file already being in the cache, this does not mean that the analysis of information stored in a caching profile is "responsive to arrival of a file at a cache." If the "file" in the examiner's rationale, is the Web page requested by the user at a client server in Arlitt, we agree with appellant that analyzing information (i.e., determining a hit rate) stored in the cache profile is not performed "responsive to arrival of a file" at the cache in Arlitt because the "file," or Web page, may never arrive at the cache if there is a determination of a "hit," i.e., the "file" is already in the cache at the local server. Thus, the examiner contends that "[d]etermination of hit rates can only be conducted in response to arrival of a file, since a reference to the file prior to its arrival is classified as a 'miss'" (answer-page 18), but the question is what is being interpreted as a "file." If the "file" is the Web page requested, then, as pointed out supra, this "file" may never arrive at the cache profile. If there is a "hit," the information is already in the local server cache and there is no analysis of such information "responsive to arrival of a file at a cache," as claimed.

Accordingly, we will not sustain the rejection of claim 8 under 35 U.S.C. § 103, as APA does not provide for the deficiencies of Arlitt.

The examiner's decision is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

AFFIRMED-IN-PART

ERROL A. KRASS   )
Administrative Patent Judge   )
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